



California Regional Water Quality Control Board

Lahontan Region

Internet Address: <http://www.mscomm.com/~rwqcb6>



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FACT SHEET (2/1/99)

UNDERGROUND STORAGE TANK (UST) PROGRAM

SITE INVESTIGATION AND REMEDIATION

Introduction

The purpose of this Fact Sheet is to describe the approach used by the Regional Board for investigation and remediation of leaking Underground Storage Tank (UST) cases. Other parts of the regions UST program are described in other Fact Sheets that may be accessed from the Region's Internet Site listed above or obtained from either office.

General Requirements

The references listed at the bottom of this document provide additional information supporting the Board's regulatory approach in requiring UST site cleanup in the Lahontan Region. The statewide UST program authorizes local agencies and regional boards to conduct oversight. In general, after a leak is discovered, investigation and cleanup is required by the responsible party with oversight by a lead agency.

Release Reporting

Responsible parties are to notify local agencies and the Regional Board of unauthorized releases in accordance with Articles 5 and 10, Chapter 16, Title 23, California Code of Regulations. Releases are reported on Unauthorized Release Forms supplied by the State Water Resources Control Board. The Regional Boards maintain the Leaking Underground Storage Tank Information System (LUSTIS) used for statewide information tracking. The Site LUSTIS number, local agency number if any, and State Board Cleanup Fund number if any, must be used on all correspondence with the Regional Board.

Lead Regulatory Agency and Designation

The lead regulatory agency for UST permitting and initial site investigation is the Local Implementing Agencies (LIAs). All counties within the Lahontan Region and the Cities of Victorville and Hesperia are LIAs. Local Oversight Program (LOP) agencies, under contract to the State Board also oversee ground water cases. Kern and San Bernardino Counties are LOP agencies. The Regional Board is the lead agency when if ground water is impacted and the site is not in a LOP county.

Single Lead Agency

Under Sections 25299.37(c)(7) and 25262 of the Health and Safety Code, the lead agency must inform responsible parties that they have the right to request that a particular administering lead agency be established. Responsible parties are not required to request a specific administering agency, but if requested, local agencies and Board staff can provide additional information regarding the process.

Landowner Participation

All current fee title holders of property affected by an unauthorized release must be notified of any cleanup or closure proposals. All reasonable steps must be taken to accommodate landowner participation in the cleanup or site closure process. Primary responsible parties are requested to provide a complete mailing list of record fee holders substantiated from the county assessor's office records and to coordinate any cleanup activities with landowners of affected property.

Case Priority and Risk

Regional Board staff prioritize case work based on human and ecological health risks posed by the site, the threat to water quality (surface water, ground water, or wetland). Case priority may change over time. Higher priority sites, with a known or undefined risk to human health or the environment will receive the focus of Board staff oversight before lower priority cases.

Self Directed Cleanup

Section 25299.77(c)(4) of the Health and Safety Code allows responsible parties to implement proposed actions after a work plan has been submitted but before approval is granted, except the work may not begin until after 60 calendar days from submittal of the work plan and after notification of intent to begin implementation is given to the regulatory agency. This allows responsible parties to independently proceed with site investigation and cleanup without first obtaining Regional Board approval. The guidance outlined in this, and other, Regional Board Fact Sheets should be used for self directed cleanup.

UST Cleanup Fund and Cost Preapproval

In 1991, the legislature created the Cleanup Fund to assist eligible UST owners and operators with funding to cleanup contaminated soil and ground water caused by leaking petroleum USTs. Qualified owners are reimbursed in a priority system as follows:

- Class A - owners of USTs located on residential property
- Class B - owners of USTs that are considered small businesses
- Class C - owners of businesses with less than 500 employees
- Class D - all others

Responsible Parties should contact the Cleanup Fund staff at the State Water Resources Control Board for more information regarding the cost recovery program and to determine which self-directed cleanup actions are eligible. The Cleanup Fund requires that cost preapproval be granted for remedial actions that are conducted and cost recovery is sought under the UST Cleanup Fund. SB 562 requires the Regional Board, responsible party, and Cleanup Fund staff to work together in obtaining preapproval. The Cleanup Fund has published cost preapproval guidance for specific remedial tasks. That information is available from the State Water Resources Control Board (Internet Page <http://www/swrcb/ca/gov>).

Scope of UST Cleanup

The scope of cleanup actions are defined in Article 11, Chapter 16, Title 23 CCR. These regulations define the cleanup phases for UST sites which are:

- Preliminary Site Assessment
- Soil and Ground water Investigation
- Corrective Action Implementation and
- Verification Monitoring.

Phased investigation is necessary to define the vertical and lateral nature and extent of contamination or pollution; cost effective procedures to detect clean up or abate contamination; and reasonable schedules for investigation cleanup, abatement and remedial actions. Responsible parties are to cleanup and abate the effects of discharges in a manner that promotes attainment of either background water or the best water quality that is reasonable in a reasonable timeframe. Ground water cleanup levels above water quality objectives defined in the Basin Plan are to be justified.

Preliminary Site Assessment

Responsible parties must submit work plans for proposed activities prior to initiating any work and make any modifications requested by the Regional

Board. The objective of field investigation is to understand site conditions, develop a hydrogeologic Site Conceptual Model, and evaluate cost-effective cleanup methods. Because of the varied and diverse climate, geology, and topography found in the Lahontan Region, work plans must be site-specific. The addition of fuel oxygenates to gasoline mixtures requires a radical new approach in conducting field investigations. A thorough understanding of the site hydrogeology is needed to assess dissolved phase plume migration in a three-dimensional environment.

Work Plans

Responsible parties are required by Section 25299.37(c)(1) of the Health and Safety Code to submit a work plan including a schedule and time line for corrective action. Work plans must include a Field Sampling Plan and Laboratory Quality Control Plan (collectively Sampling and Analysis Plan) with the following items and provide for collecting sufficient data and making technical interpretations upon which to base decisions.

- site maps
- time schedules for performance of work
- descriptions of proposed work including locations for sample collection and rationale
- an evaluation of adjacent site conditions, including surface waters, drinking water and production wells within one mile
- an evaluation of immediate health or safety hazards caused by the site
- provide for full definition of both the vertical and lateral extent of both affected soil and ground water
- determine ground water flow conditions and contaminant fate and transport in both the vadose and saturated zones
- a description of proposed field sampling and laboratory analytical methods
- procedures for data quality assurance
- a list of Constituents of Concern (COC)

All work plans and technical reports must be signed by a California registered civil engineer or geologist.

Board staff do not specify particular protocols for conducting investigations; however, they may make recommendations. Responsible parties should refer to the series of guidance documents called Hydrogeologic Characterization and Ground water Investigations (1994, Cal-EPA). These documents may be purchased from the CA Department of Toxic Substances Control (Internet Page <http://www.dtsc.ca.gov/smp/smtgdpp.htm>).

Sampling and Analytical Requirements



The following information items relate to sampling and analysis.

1. Use of field screening methods is encouraged for making quicker onsite characterization decisions. This data may be used for screening purposes only.
2. Regulatory determinations must be made on the basis of data analyzed in a laboratory certified by the CA Department of Health Services.
3. Board staff recommend US EPA method 8260B for soil and ground water sampling and analysis of volatile constituents. Fuel oxygenates are not among the constituents specifically listed for reporting under method 8260B and must be specifically requested on the Chain-Of-Custody form. All analytes detected by method 8260B must be reported.
4. Minimum reporting limits for soil and aqueous samples are specified in the Fact Sheet entitled *Water Quality Objectives*.
5. Soil sample collection should minimize volatile losses. The US EPA method 5035 (ref. SW-846 version III) is a significant departure from traditional soil sampling methods. This method requires field preservation of soil samples or the use of specialized instruments. Field sampling crews should become trained on this new procedure.
6. Laboratory data sheets must indicate which petroleum type matches the results of total petroleum hydrocarbon (TPH) analysis.
7. All exceptions to minimum reporting limits due to matrix interference effects or other conditions must be explained.
8. Laboratory data sheets are to be signed.
9. Laboratory Quality Assurance/Quality Control (QA/QC) results are to be reported. Trip and equipment rinse blank analysis results should be reported.

Fuel Oxygenate Analysis

The fuel oxygenates, methyl-tertiary-butyl ether (MTBE) and tertiary amyl methyl ether (TAME) must be included as an analyte for soil and ground water sampling and analysis at all gasoline release sites in addition to petroleum hydrocarbons. Other oxygenates may be present and should be determined. All initial detections of MTBE at a site (or in ground water) must be reported to this office. The need for continued MTBE analysis, if not initially detected, must be made using best professional judgment in consultation with the appropriate regulatory staff.

MTBE Reports to Water Purveyors

Recently enacted legislation (SB 592) requires Regional Boards to make quarterly reports to public water system operators of all locations in the region where MTBE has been discharged (to soil, surface water or ground water) and locations where MTBE has been detected in ground water.

Ground water Monitoring

A minimum of three points are needed to establish the ground water directional gradient. Field Investigation methods (such as HydropunchTM) can be used to quickly establish site conditions in some cases. Four inch monitoring wells are preferred in deep ground water situations. Permits from the appropriate local permitting agency are required for ground water monitoring well installation and destruction. Well screens must be of sufficient length and in correct locations to allow collection of representative samples in the strata of interest. Clustered monitoring wells screened at various depths may be required to evaluate fuel oxygenate concentrations. The top of casing elevation must be established by a California registered civil engineer or land surveyor. Well construction details must be provided in technical reports submitted to the Regional Board.

Ground Water Sampling

All monitoring wells must be properly developed. Field parameters consisting of depth to ground water, turbidity, pH, temperature, and electrical conductivity must be stabilized and determined prior to collecting a sample. Board staff recommend the use of US EPA protocols for low flow sampling (*less than 0.5 liters/minute for purging and 0.2 liters/minute for sampling*).

No-Purge Sampling

Decisions to use No-Purge Sampling must be made on a site specific basis. Responsible parties must assume responsibility for providing technical justification that no-purge sampling is appropriate on a site specific basis. Board staff would consider use of no-purge sampling under the following conditions:

- well construction details are known and the well is properly permitted, constructed and developed
- wells are in an unconfined water table and screened across the water table
- no free phase petroleum hydrocarbons are measured in the well
- the well head completion is competent
- the well is impacted only with petroleum hydrocarbons



- the well is not used for active remediation
- in areas of high recharge, this method may only be used for wells located close to the source area. Wells farther from a source may not be representative due to “diving plumes”. This is observed in situations where deep screened production wells draw down the plume or where infiltrating water forces the plume down.
- Both purge and no-purge samples must be collected initially and prior to closure.

Investigation Reports

A technical report documenting the investigation results must be submitted, preferably no later than 60 days following the site work. It should include recommendations for any necessary additional investigation.

Interim Remedial Actions (IRA)

Responsible parties are required by 16 CCR 2722 to implement interim remedial actions as necessary to abate or correct the effects of an unauthorized release. These measures may take place during any phase in the cleanup. Interim remedial actions may be numerous, but the most effective measures are (1) free product removal, (2) contaminated soil excavation, and (3) ground water containment.

Free Product Removal

Chapter 16 states that responsible parties “*shall remove free product to the maximum extent practicable*” and “*in a manner that minimizes the spread of contamination into previously uncontaminated zones by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site.*” Mass removal of the product by skimming or vapor enhanced recovery are both effective.

Soil Excavation

The most important factor in ground water remediation is source removal. Significant contaminant mass may be localized in soil beneath the site. In areas of shallow ground water it may be more feasible to remove this source in the short-term at less cost by “hot-spot” excavation of soil as compared to long-term clean up. Soil Vapor Extraction (SVE) and/or bioventing are the other common soil remedial options.

Ground Water Containment - Hydraulic Control

Hydraulic control and containment of the dissolved phase plume is necessary to protect water supplies and limit the undue spread of dissolved phase contaminants. Situations requiring control include (a) constituents posing an immediate threat to water

supplies or public health and safety, or (b) the plume appears to be migrating at a rate that will limit the ability to later remediate the plume.

Schedule vs. UST Cleanup Funding [the “Bishop Policy”]

In the Bishop (Inyo County) area, the Regional Board approved criteria in the Basin Plan allowing cleanup schedules to be based upon the availability of resources in the UST Cleanup Fund. The policy applies to applicants in Trust Fund categories “A”, “B”, and “C” and where hydrogeologic conditions are similar to Bishop [*low permeability clay soils, shallow ground water, slow ground water velocity, no known water supply wells in the vicinity of the release, and plumes that migrate slowly but have little, or no, degradation without active remediation*]. The policy is as follows:

- When USTs are removed, soil pollution is removed to the property boundaries and to the water table, but not beneath existing buildings.
- Soil samples are collected to document effective removal or the location of contaminated soils that remain.
- Floating fuel is removed from the water table.
- Field investigation methods, such as HydropunchTM, are used to preliminarily define the lateral extent of ground water pollution. A maximum of three monitoring wells are located down-gradient of the pollution, which may require installation of wells offsite.
- Monitoring and analysis of ground water is conducted and free product removal continues, as necessary.
- The responsible party is not required to continue active soil or ground water remediation until Cleanup Funds are available, provided documentation is provided that an application has been filed with the State Board.
- Dissolved phase cleanup is required prior to receiving Cleanup Fund reimbursement only if the claimant is ineligible or if the site poses an imminent threat to public health.

Corrective Action Plan (CAP) Requirements

16 CCR §2715 states that a regulatory agency shall “*approve CAPs that adequately protect human health, safety, the environment and protect current and potential beneficial uses of water*”. CAPs are to contain an Impact Assessment, which evaluates site conditions and a Feasibility Study, which evaluates multiple cost-effective alternatives to mitigate the effects of the unauthorized release.

(CAP) Impact Assessment



The Impact Assessment is an evaluation of site conditions as determined during the investigation. An adequate understanding of the site hydrogeology is a key component of applying the best cleanup technology.

(CAP) Feasibility Study

The Feasibility study must evaluate at least two alternatives for restoring and protecting waters that have beneficial uses designated in the Basin Plan and one alternative if no beneficial uses are designated. The preferred alternative must be a proposal which:

- has a high likelihood of success
- has a reasonable timeframe for compliance, and
- will achieve the cleanup goals of plans and policies adopted by the State or Regional Boards; and
- is not likely to require ongoing maintenance

The CAP must include proposed cleanup levels for both soil and ground water.

Natural Attenuation Proposals

The State Board recommends that oversight agencies aggressively close low-risk soil only cases. Further, they recommend that active remediation be replaced with monitoring at low-risk ground water cases. Natural attenuation should be considered as one alternative where site conditions allow. Site characterization and source removal must be complete and other remedial alternatives considered. A health risk based closure is not considered a substitute for corrective actions that restore ground water beneficial uses.

Reporting Requirements

Responsible parties must report on monitoring results and the status of IRAs or CAPs as required by the regulatory agency. Reports should be submitted quarterly or at a frequency established by the regulatory agency. The need for monitoring reports must bear a reasonable relationship to the need for the report and the benefits to be obtained from the report.

Waste Discharge Requirements [Discharge Permit]

Treatment systems that discharge waste must submit a Report of Waste Discharge to the Regional Board. The need for Waste Discharge Requirements (WDRs or a permit to discharge) will be evaluated by Board staff on a case-by-case basis. The Regional Board currently has adopted two General Permits that may apply to UST cleanups, as follows.

- Board Order No. 6-98-75 (Surface Water Disposal of Treated Ground Water), NPDES No. CA 0103080.
- Board Order No. 6-93-106 (WDRs for Land Disposal of Treated Ground Water). This general permit is being updated and is scheduled for adoption in early 1999.

References

1. Chapter 6.7 of the California Health and Safety Code (HSC)
2. Division 7 of the California Water Code
3. Title 23, Division 3, Chapter 16, California Code of Regulations (16 CCR)
4. Water Quality Control Plan for the Lahontan Region (Basin Plan), 1995 [Sections 4.2 and 4.6 also contain policy criteria for conducting site investigation and cleanup at UST sites]
5. State Board Resolution 68-16 (Statement of Policy with Respect to Maintaining High Quality of Waters in California)
6. State Board Resolution 88-63 (Sources of Drinking Water)
7. State Board Resolution 92-49 (Policies and Procedures for Investigation and Cleanup and Abatement of discharges Under Water Code Section 13304)
8. Underground Storage Tank Unauthorized Release (Leak)/Contamination Site Report form, HSC 05 (8/90) obtained from the State Water Resources Control Board
9. Underground Storage Tank Cleanup Fund, Questions and Answers, SWRCB, January 1996
10. Cost Guidelines, Underground Storage Tank Cleanup Fund, SWRCB, July 1996
11. Leaking Underground Fuel Tank (LUFT) Manual, 1986, 1989, State Water Resources Control Board
12. Tri-Regional Board staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites 1990, Regional Boards 1,2 & 5
13. Expedited Site Assessment Tools for Underground Storage Tank Sites, A Guide for Regulators, EPA 510-B-97-001, March 1997
14. Series reports called, Hydrogeologic Characterization and Ground water Investigations, 1994, Cal-EPA
15. US EPA SW-846, version III, December 1996
16. US EPA Memorandum, Clarification Regarding the Use OF SW-846 Methods, Office of Solid Waste and Emergency Response, August 7, 1998
17. California Well Standards - Bulletin 74-90 & 74-81, 1981, 1991, CA Department of Water



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18. Staff Report, Lahontan Regional Board, Petroleum Hydrocarbon Cleanup Approach for Soils, October 1997
19. Staff Report, Lahontan Regional Board, Lawrence Livermore National Laboratory Report, Recommendations to Improve the Cleanup Process, for California's Leaking Underground Fuel Tanks, February 1996
20. Lahontan Regional Board letter, March 27, 1996, Lahontan Regional Board Comments Regarding the LLNL Reports
21. State Water Resources Control Board letter, December 8, 1995, Interim Implementation Guidance
22. Staff Report, Lahontan Regional Board, Establishing Ground water Cleanup Standards and Approval of Site Cleanup Efforts, October 1994
23. Staff Letter, Lahontan Regional Board, Methyl-tert-Butyl Ether (MTBE) Sampling Required for Case Closure at Leaking Gasoline Underground Storage Tank (UST) Cases, February 5, 1998
24. Staff Letter, Lahontan Regional Board, Petroleum Hydrocarbon and Fuel Oxygenates Sampling Requirements at Leaking Underground Storage Tank (UST) Sites, January 19, 1999

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